

REMARKS

The specification has been amended to make editorial changes therein. Element number 12 does not appear in the drawings and has been removed from the specification.

The claims were rejected under §112, second paragraph, and have been amended as to form. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 14-15, 17-21, and 23-26 were rejected as anticipated by RAGGAM et al. 4,451,331. Claim 16 was rejected as unpatentable over RAGGAM et al. and claim 22 was rejected as unpatentable further in view of MCONIE et al. 5,562,832. Claim 14 has been amended to further define the wall of the cylinder and reconsideration and withdrawal of the rejection are respectfully requested.

RAGGAM et al. do not disclose that a peripheral wall of the cylindrical body consists of heating longitudinal tubes, carrying a thermal carrier fluid, provided along a generatrix of the cylinder and spaced from each other to provide longitudinal slots for outlet of vapor but not for outlet of material, where steam generated by heating the wastes is discharged through the longitudinal slots. Accordingly, the amended claims avoid the rejections under §102 and 103.

The apparatus for compressing and drying wastes according to the present invention has peculiar features, which are very important for achieving the following objects:

- 1.drying and sanitizing wastes; and, at the same time
- 2.drastically and definitively reducing the volume of the wastes;

thus consequently obtaining a biological and mechanical stabifization of the final product, which can be detected by the absence of any pathogens and of any tendency to being re-invaded by pathogens, and further by the degree of production of odors and biogases.

These objects were achieved by experimentation through a test plant, simplified with regard to its realization and management, which proved to be effective in obtaining the preset purposes.

Further, in order to realize the predicted goals, before any experimental test was made, all structural and thermotechnical aspects were studied in detail, such as material wear and corrosion, realization and operating costs, different kind of material emissions and their depuration, automation and control, possibility of transport of the plant and mechanic and acoustic safety.

By comparing the wished results with the vast number of variables intervening during the process of thermic and pressure drying, the most important parameters were identified and a reliable apparatus was proposed, fit to accomplish the preset tasks.

The main goals of the invention are stated in the

application when introducing the invention: drying up of urban solid wastes and definitive volume reduction thereof.

The first aim is achieved by supplying heat.

The second aim is achieved by simultaneously applying pressure.

The peculiarity of the solution according to the present invention is how to combine the two different kinds of treatment.

The main issues to be considered are the following.

To dry means to transmit heat, which is done according to the present invention by conduction. This involves at the same time the need for:

- having a great surface of contact for exchanging heat between a heat source and the wastes;
- providing for a big number of openings in order to allow the escape of vapours coming from the heating of the liquid portion of the solid wastes;
- increasing the overall thermic transmission factor.

To press at the same time as transmitting heat means operating by means of suitable pressing forces, but, at the same time, impose the following requirements on the structure of the plant:

- very good resistance against radial pressure, at temperatures close to 190°C;
- good resistance against wear;
- satisfactory resistance against corrosion.

Not all of these requirements match with one another.

As an example, the number of openings to be present on the lateral walls of the heating apparatus, in order to allow the escape of vapors, necessarily have to be large. As a drawback, the large number of openings involves a decreasing of the surface of contact between the heat sources and the mass of wastes to be treated, and also involves a reduction of the structural resistance of the walls of the apparatus. These opposite requirements are solved by proposing a cage drying - compacting apparatus according to the present invention, in which the lateral walls of the apparatus are substituted by a plurality of tubes, coursed by a thermal carrier fluid, provided along the generatrices of the cylinder and spaced each other, in such a way to realize longitudinal slots for outlet of vapor.

The tubes, with the help of suitable retainer rings, positioned at a suitable distance from each other, in reason of their moment of inertia, can act very well as the supporting structure for the mass of wastes and efficiently oppose against radial thrust, even at high temperatures.

Further, the interspace between one tube and another represents an opening for the escape of vapors, the apparatus having so many openings as the number of tubes, without jeopardizing the mechanical resistance of the apparatus with respect to the operating pressing forces.

Finally, the problem of adhesion of the wastes to the

heating surface, as the drying action proceeds, was faced.

In order to prevent the mass of wastes from getting stuck inside the apparatus, additional pressure plates were positioned at the outlet of the apparatus.

The presence of pressing plates both at the inlet and at the outlet of the apparatus ensures that:

- the pressing force is uniformly distributed on the wastes, all over the length of the apparatus;
- the adhesion of the wastes to the inner lateral walls of the apparatus is prevented;
- the overall thermic exchange factor is increased;
- the rate of ejection of vapors formed inside the apparatus is increased.

In contrast, according to RAGGAM et al. disclose that the shell 1 of the compacting apparatus is constituted by a cylindrical wall, not by a plurality of tubes provided along the generatrix of the cylinder and spaced from each other, in such a way to realize a cage-like container, provided with longitudinal slots for outlet of vapor.

In fact, according to RAGGAM et al. (column 5, lines 58-66), the gap between the piston 4a and the shell 1a does not serve to allow the steam to escape from the apparatus. On the contrary, even if the steam is allowed to escape upwardly (on the other side of the piston's head) it is kept inside the apparatus. According to RAGGAM et al., the presence of steam inside the

apparatus is important to assist the mechanical pressure applied by the piston. In order to keep the steam inside the apparatus a sealing element (5 in figure 1, 5a in figure 2, 14 in figure 3, Sb in figures 5 and 7) is provided according to RAGGAM et al.

Claims 14-26 were rejected on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims 1-11 in U.S. Patent 6,298,576. Please make of record the Terminal Disclaimer that accompanies this amendment. Reconsideration and withdrawal of the rejection are respectfully requested in view of the Terminal Disclaimer.

Charge the Terminal Disclaimer fee of \$65 to Deposit Account No. 25-0120.

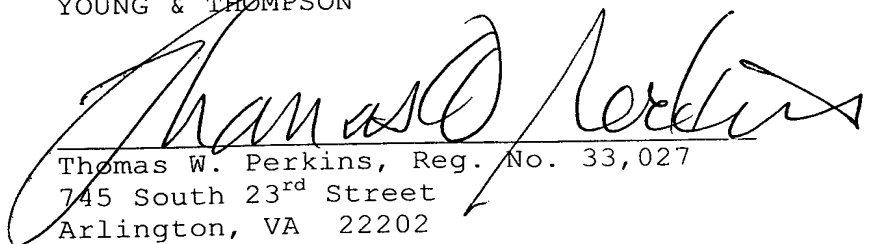
In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment

to Deposit Account No. 25-0120 for any additional fees required
under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

A large, stylized handwritten signature in black ink, which appears to read "Thomas W. Perkins". The signature is written over a horizontal line that separates it from the printed contact information below.

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APPENDIX:

The Appendix includes the following item(s):

- ☒ - a terminal disclaimer
- ☐ - a 37 CFR 1.132 Declaration
- ☐ - a new or amended Abstract of the Disclosure
- ☐ - a Replacement Sheet for Figure of the drawings
- ☐ - a Substitute Specification and a marked-up copy of the
originally-filed specification
- ☐ - a verified English translation of foreign priority document